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of

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for

VIRTUAL HOME DATA REPOSITORY AND DIRECTORY

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1 **1. Related Applications**

2 This application claims priority to Provisional Application Serial Number -
3 60/174,113, filed December 31, 1999.
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6 **2. The Field of the Invention**

7 The present invention relates to methods and apparatus for storage and retrieval of
8 information relating to a structure, such as a home, office or similar structure. The
9 information is stored electronically on a computer-based system and may be accessed directly
10 from a single computer or over a computer network. Information about the structure's
11 physical attributes can be stored as a two- or three-dimensional model of the structure which
12 can be viewed on a display. The model database may also be queried for specific details
13 such as room dimensions, materials, and areas. The contents of each room may also be
14 stored in the system including floor and wall coverings, but also including furniture and
15 semi-stationary items such as vases, artwork and appliances. In addition to physical
16 attributes and contents, the system can store information regarding required and
17 recommended maintenance schedules, warranty requirements and terms, insurance details,
18 dates of purchase, vendor identification, anticipated life spans and other information
19 pertinent to a structure, its history, its contents, its occupants or related items.
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25 **3. Background**

26 Modern structures and other structures are typically designed and built to last for a
century or more. During their lifetimes structures can undergo extensive changes, but often

1 retain key structural elements throughout their usable lives. While these key elements remain
2 somewhat static, other structure elements can change relatively quickly. Structure framing
3 and structural elements remain fairly static while paint, carpet and other wearable items are
4 replaced regularly. When items are replaced, the owner will typically arrange for a contractor
5 to measure the element that needs to be replaced and estimate the cost of replacement. This
6 will generally involve a trip to the site by the contractor or other tradesman who will measure
7 the item and estimate a cost for replacement or repair. For each item, an owner may solicit
8 several estimates necessitating several trips and several measurements so that each estimator
9 may calculate a bid for the project.

12 Projects can be further complicated by warranties and insurance policies with
13 requirements and restrictions which must be met by participating contractors and the owner.
14 Often an insurance adjustor must also visit the site and make independent measurements and
15 assessments.

18 Sometimes, a history of what has happened to the structure is required for insurance
19 or warranty purposes. This information may also need to be solicited by multiple parties
20 making repeated dissemination by the owner tedious and error-prone.

21 When a structure changes ownership, some warranties and insurance policies will
22 carry over to the new owner. Information pertinent to the structure and the policies must be
23 accurately transferred between the old and new owners. This process will often be neglected
24 or forgotten and inaccurate or false information will result. It is also beneficial to have a
25 record of the tradesman and their addresses in case the work performed is faulty.
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1 Furniture, artwork, appliances and personal items that are kept within a structure
2 may also be covered by various insurance policies and warranties. An accurate inventory of
3 these items and information regarding their coverage can be a valuable asset. Especially
4 when theft or fire occurs, an accurate inventory including the location of the items will be
5 invaluable in settling insurance and warranty claims.
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7 A record of the location of valuable documents can also be an asset. Wills,
8 investment records, deeds and other important documents may be located in a location
9 hidden in the structure. A password-protected confidential location for these documents
10 would be beneficial for access by specific relatives or personnel when needed.
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12 An accurate and descriptive database including a three-dimensional model,
13 photographs and listings of contents, warranties and other information can also be a great
14 asset at the time a structure is sold. When a buyer can access all this information from one
15 source, both the buyer and seller will benefit from a more informed negotiation and deal.
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1 anticipated life spans, wear and tear schedules, insurance coverage, location of and
2 information regarding structure components or contents and similar information regarding
3 furnishings and appurtenances of the structure.
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5 Embodiments of this electronic model and data storage system can be accessible via
6 a computer network and, more particularly, via a global information network such as the
7 Internet. As such, the present invention also features a computer-readable memory for
8 storing and maintaining information related to a structure.
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10 These embodiments can facilitate the exchange of information by allowing interested
11 parties to remotely access the model and data storage for information regarding the structure,
12 its elements or related information. For example, if an owner desires to replace carpet in
13 specific rooms of the structure, the owner can inform eligible contractors of his desire and
14 allow the contractors to access the electronic model of the structure for the purposes of
15 measuring and estimating the cost of the replacement. Simultaneously, insurance adjustors
16 and other interested parties can access identical information in the same way. Along with
17 the physical attributes of the room, other pertinent information can be stored. In the case of
18 carpet replacement, the quality, age and condition of the existing carpet can be stored so that
19 contractors can estimate the needed quality or durability of a replacement. The structure
20 owner may also store information specific to the estimate such as a desired life span for the
21 replacement carpet, desired stain-resistance or other features. This same information can be
22 stored for every feature of the structure and can be updated periodically to reflect a
23 continuous history of structure maintenance and revision.
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Maintenance requirements and information can also be stored in the system. These requirements may be stored in a static record or may be stored so as to activate prompts to the owner or designated others so that maintenance steps can be accomplished at recommended intervals. The system can be configured to automatically notify designated maintenance personnel to accomplish tasks at the recommended intervals or the owner can be prompted to arrange for the maintenance.

Accordingly, it is an object of some embodiments of the present invention to provide a system for storing and maintaining an electronic model of the physical attributes of a structure.

It is also an object of some embodiments of the present invention to provide a system for storing and maintaining non-physical information regarding a structure, its components, its contents and obligations and liabilities associated therewith.

Another object of some embodiments of the present invention is to provide a system for providing physical and non-physical information related to a structure to others via a computer network.

These and other objects and features of the present invention will become more fully apparent from the following, description and appended claims, or may be learned by the practice of the invention as set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In order that the manner in which the above-recited and other advantages and objects of the invention are obtained, a more particular description of the invention briefly described above will be rendered by reference to specific embodiments thereof which are illustrated in the appended drawings. Understanding that these drawings depict only typical embodiments of the invention and are not therefore to be considered to be limiting of its scope, the invention will be described and explained with additional specificity and detail through the use of the accompanying drawings in which:

Figure 1 is a diagram illustrating an exemplary master structure data;

Figure 2 is a diagram illustrating details of non-physical information data;

Figure 3 is a diagram illustrating details of real and personal property data;

Figure 4 is a diagram illustrating details of real property inventory;

Figure 5 is a diagram illustrating details of personal property inventory;

Figure 6 is a diagram illustrating details of warranty and policy data;

Figure 7 is a diagram illustrating details of graphical data;

Figure 8 is a diagram illustrating details of scheduling data;

Figure 9 is a diagram illustrating details of contact data; and

Figure 10 is a diagram illustrating details of projects data.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention provide centralized access to structure information so that owners, insurers, contractors, maintenance personnel and other users may access an accurate and reliable repository of information which communicates relevant attributes of the structure, its components, its contents and the obligations and liabilities related thereto.

Embodiments of this electronic model and data storage system can be accessible via a computer network and, more particularly, via a global information network such as the Internet. As such, the present invention also features computer-readable data transmission signal containing a data structure. The computer-readable data transmission signal comprises: 1) a first portion identifying an electronic model of a structure contained in a data storage system that a client is requesting from a server, wherein the client may receive detailed information regarding the physical characteristics of the structure; and 2) a second portion identifying a session for communicating between the client and the server, the session allowing a user to receive information pertaining to the structure. The computer-readable data transmission signal may include both feature specific information and non-physical information, or a combination of both.

In addition, a computer-readable memory for storing and maintaining information related to a structure is used. The computer-readable memory is configured so that it can be used to direct a computer: 1) to gather and store an electronic model of the physical features and attributes of the structure on an accessible computer network; 2) to gather and store feature-specific information pertaining to the structure, the information also stored on

1 the accessible computer network; 3) to gather and store non-physical information pertaining
2 to the structure, the non-physical information also stored on the accessible computer
3 network; 4) to access and retrieve the information related to the structure; and 5) to present
4 the information related to the structure to a graphical user interface. These steps may be
5 conducted over a network such as an internal network, or a global information network such
6 as the Internet.

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8 Figure 1 shows a general relationship between the embodiments of the present
9 invention and how the various elements interact with one another to form master structure
10 database 2. While not meant to be limiting, master structure data base 2 is shown to
11 incorporate non-physical information database 4, real and personal property database 6,
12 scheduling database 8, contact database 10, graphical database 12, and projects database 14.
13 Each of these is described in greater detail below.

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15 Figure 2 depicts embodiments of the present invention integrating the attributes of
16 a structure with non-physical information relative to the structure's elements such as: owners
17 16, occupants 18, insurers 20, warrantors 22, builders 24, maintainers 26, furnishers 28,
18 content providers, related parties 30, etc. Contact information is also stored regarding all of
19 the non-physical participants in contact data 10. This information is provided at a centralized
20 network site so that all information pertinent to a structure or portion thereof can be accessed
21 from a single source. Multiple parties may access this information repository so that several
22 contractors, insurers or others may have simultaneous access to the information thereby
23 speeding competitive bidding and other processes used by the system.

1 Preferred embodiments of master structure data 2 comprise an electronic model of
2 a structure which accurately portrays real and personal property 6. Figure 3 shows the
3 relationship between the real property inventory 32, personal property inventory 34, and the
4 warranty and policy data 36 for all items contained within real and personal property data 6.
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6 Some embodiments of real property inventory 32 are exhibited in Figure 4. Real
7 property inventory 32 consists of all inventory items associated with the structure 42.
8 Examples of inventory items 42 could be a three-dimensional model of elements comprising
9 walls, floors, ceilings, roofs, structural members, finished surfaces, floor coverings,
10 windows, doors and other elements. The three-dimensional model of inventory items 42 can
11 be retrieved from graphical data 12, described in greater detail below. Associated with such
12 inventory items 42 are real property data tags 40. Data tags 40 provide a reference to
13 warranty and insurance information. Furthermore, data tags 40 provide means for
14 referencing inventory items 42 to claim and service history 38 of particular items.
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17 As depicted in Figure 5, other information related to the structure is integrated
18 within real and personal property data 6 as personal property inventory 34. The contents of
19 a structure including all personal property inventory items 50 which would normally be
20 removed if the owner moved from the structure. Personal property inventory items 50 could
21 be, but are not limited to, furniture, artwork, fixtures, appliances and other items. Inventory
22 items 50 may be represented as physical representations in the model from graphic data 12
23 or they may be represented as textual information. Objects representing physical objects in
24 the structure may be shown in the model as a physical rendition of the object in the form of
25 an icon positioned in the correct location in the structure model. Similar icons are displayed
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1 for other items located in the room and other elements of the room such as windows, doors,
2 furniture, etc. Selecting a specific icon will access information relevant thereto and provide
3 access to further details. Alternatively, these objects may be represented in a text index that
4 is associated with the room in which they are located or some other associative model.
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6 Information stored 52 about inventory items 42 could be, but is not limited to, their
7 location on the floor plan of the model, the sizing/footprint of the item, its name, existing
8 options and special features, their serial numbers, model numbers, manufacturer, policies and
9 warranties, notes, instructions, date and place of purchase, original value, picture of each
10 item, maintenance schedules, and service and maintenance histories. Associated with such
11 inventory items 50 are personal property data tags 48. Like data tags 40 previously
12 described, data tags 48 provide a reference to warranty and insurance information.
13 Furthermore, data tags 48 provide means for referencing inventory items 50 to claim and
14 service history 46 of particular items.
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18 As disclosed in Figure 6, applicable policy and warranty coverage is linked 66
19 through means of data tags 40 and data tags 48 to items in real property inventory 32 and
20 personal property inventory 34, respectively. The details of warranties, insurance policies,
21 maintenance records and requirements and other information may also be stored so that it can
22 be accessed in relation to the location of the object related thereto. As a non-limiting
23 example, a floor covering or appliance with a warranty is represented as an icon displayed
24 in or adjacent to a room in the physical model. Selecting the associated floor or appliance
25 icon accesses a file that contains the date the covering or appliance was installed, the term
26 of the warranty, details of warranty coverage, conditions of the warranty, maintenance

1 requirements, recommending cleaning methods, installer information and other related
2 information.

3 Additionally, within warranty and policy data 36 is an embodiment which provides
4 the user with claim specific data 64 on inventory items for making a claim with a warranty
5 provider or insurance provider. Warranty and policy data 36 also embodies an infobase 54
6 for keeping track of all inventory specific coverage and claims. Incorporated in infobase 54
7 is a means for storage and retrieval of warranty text and terms 58, and a means for linking
8 users to warrantors 62. Furthermore, insurance text and terms 56 are stored with means for
9 linking users to insurers 60.
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11 Figure 7 reveals an additional embodiment of the present invention, graphical data
12 12 is used to display to the user the contents of master structure data 2. As part of graphical
13 data 12, information about a physical model 68 are collected. Physical models 68 can be
14 two-dimensional or three-dimensional containing information such as floor plans,
15 dimensions, property ID, inventory item icons, and inventory item links. As a non-limiting
16 example, two-dimensional physical model 68 which reflect plan views of each floor of the
17 structure may be used. These physical models 68 represent the physical dimensions and
18 attributes of the structure and its various components. Dimensions on which the physical
19 model 68 is based may be acquired from advanced G.P.S. or satellite systems, by scanning
20 blueprints, by access to other databases, or be taken from as-built structure plans, direct
21 physical measurement, or other physical measurement systems such as infrared or other
22 electronic systems so that they accurately reflect the existing state of the structure.
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1 Photographs 70 can be inputted thru scanning or digital means and become tied to physical
2 model 68 for a user to view when observing physical model 68.

3 Turning now to Figure 8, what is shown is scheduling database 8. The present
4 invention is designed to allow the user to record information regarding the dates of purchase
5 of various components and/or contents contained in the structure, and the vendors from
6 which these various components or contents have been purchased. This information further
7 incorporates warranty and policy data 36. Once this information has been entered, the data
8 is synched with a scheduling function having scheduled reminders 78 which track various
9 events such as maintenance schedules, warranty coverage, insurance coverage, and other
10 information. As it is determined that service on an item or the structure itself is needed,
11 scheduled reminders 78 are queued in queue 76. At this time, contact data 10 is retrieved
12 from contact database 10 containing information as described below. Subsequently, work
13 schedules 74 for needed professionals, insurers, banks, warranty holders, etc. are obtained.
14 These work schedules and the information about the scheduled reminders are automatically
15 provided to the user through a notifier 75. This process can occur as often as needed to track
16 and schedule several events. Upon notification, a scheduling history 72 is generated, which
17 is stored in scheduling database 8. Scheduling history 72 can be retrieved later if necessary
18 and includes information pertaining to each project.

19 Other data that may be entered intending to be included into scheduled reminders
20 78 might include anticipated life spans, wear and tear schedules, insurance policies and
21 warranty requirements. These may be incorporated into the records of the present invention
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1 so that items may be properly valued and their replacement or repair scheduled and budgeted
2 in advance.

3 The notify 75 feature of the present invention alerts the owner and/or others of
4 important events regarding structure maintenance and protection. An owner may be notified
5 of the impending requirements so that they may be scheduled and accomplished. An owner
6 or user may also designate a particular contractor or maintenance provider to accomplish an
7 event and have the system automatically generate the necessary authorization to have a
8 service provider accomplish the task. This is done by importing contact data from contact
9 database 10 as discussed below. Upon the completion of an event or service, the record may
10 be updated to reflect the new improvement or condition.

11 Figure 9 shows a detailed illustration of contact data 10. Contact data 10 may
12 contain specific contact information 80 about insurance companies, warranty providers,
13 maintenance providers, and any other personnel/information relevant to the structure and any
14 items or non-physical information. The embodiments of the present invention may utilize
15 computerized text files, databases, digital photographs and other images and models as well
16 as other records to generate specific content information 80 contained in contact database 10.
17 Once this information is compiled it is storied in contact data 10 to be used in conjunction
18 with the embodiments of the system of the present invention.

19 As also shown in Figure 9, the present invention provides for direct linking to other
20 programs to perform some functions of the present invention, or to other databases. For
21 example, links may be provided to databases containing bank accounts and credit accounts,
22 etc. This information may then be used by the system of the present invention to perform its
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1 designated function. In addition, links may be incorporated into the system that link to
2 vendors, materials suppliers, professional services providers, etc. These links are shown
3 generally in Figure 9 as links to learning objects 82.
4

5 Figure 10 shows a detailed illustration of projects database 14. The essence of this
6 database is to record and track proposed projects 84, planned projects 86, and projects that
7 are currently in progress 88 regarding the structure. As discussed above, and working in
8 conjunction with projects database 14, a physical model is provided so that contractors and
9 others may compile and submit estimates to the system of the present invention that are
10 based on the dimensions reflected in the model, thereby negating the need to perform an on-
11 site visit. Availability of this model will allow non-local contractors and others from remote
12 locations to competitively bid a project without incurring costs associated with site visits and
13 independent measurements.
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16 Projects database 14 allows any person involved or that may possibly be involved
17 in a project to access the information contained therein. In addition, proposed projects 84
18 may arise from the owner, third persons, or from the scheduled database as described above.
19 For example, and as can be seen in Figure 10, if a project is in need of completion, persons
20 involved or that have potential involvement in the project may access the system and project
21 database 14. Bids may be placed, instructions may be obtained, and other information may
22 be compiled by the owner regarding the project. This information is then either accepted or
23 rejected by the owner of the structure. Upon the completion of a project, the information
24 concerning that project is stored in the completed projects history 90 as contained within
25 projects database 14.
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1 Completed projects history 90 may include information such as project estimates,
2 project negotiations, project dates, completion times, vendors and/or professionals who
3 worked on the project, materials and supplies purchased with their associated costs, and any
4 other information relevant to a project. In addition, the database could be modified to
5 include information pertaining to proposed projects and projects that are currently ongoing.
6 Other types of information that may be stored is records of past stages of the project, and the
7 sequence of construction of a new structure, which can be retained or forwarded to a
8 financial institution to verify progress before payment of the next installment.
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11 The present invention may be embodied in other specific forms without departing
12 from its spirit or essential characteristics. The described embodiments are to be considered
13 in all respects only as illustrated and not restrictive. The scope of the invention is, therefore,
14 indicated by the appended claims rather than by the foregoing description. All changes
15 which come within the meaning and range of equivalency of the claims are to be embraced
16 within their scope.
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